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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,251	02/19/2004	Richard E. Pingree Jr.	ATI-0022	2250
23413 7590 08/28/2008 CANTOR COLBURN, LLP 20 Church Street 22nd Floor Hartford, CT 06103				
EXAMINER				
AKRAM, IMRAN				
ART UNIT		PAPER NUMBER		
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08/28/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/708,251

Applicant(s)

PINGREE ET AL.

Examiner

IMRAN AKRAM

Art Unit

1795

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 June 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 and 17-33 is/are pending in the application.
- 4a) Of the above claim(s) 1-13 and 27-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14, 15, 17-26, 32 and 33 is/are rejected.
- 7) ☒ Claim(s) 14, 15, 17-26, 32 and 33 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 6/26/08 have been fully considered but they are not persuasive. The rejections are maintained in light of the amendments.
2. Applicant argues on page 9 of the Arguments that the Gaisford reference does not disclose a plasma processing chamber or an electromagnetic energy source downstream from it. Examiner respectfully disagrees. The funnel in Figure 11 of Gaisford can be considered a plasma processing chamber because no details are claimed as to what that entails. Simply calling it a plasma processing chamber does not differentiate it from the vessel disclosed in Gaisford. Since this is true, electromagnetic source 35 can certainly be considered downstream of the chamber as seen in the figure.
3. It is important to note that claims 14, 15, 17, 18, and 32 are all apparatus claims. In response to applicant's argument that Gaisford does not disclose a source to vaporize the solid material contained therein, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. Nothing about Gaisford precludes this possibility were the EM source turned high enough.
4. Applicant's arguments with respect to claims 19-26 and 33 have been considered but are moot in view of the new ground(s) of rejection necessitated by amendment.

Claim Objections

5. Claims 14, 15, 17-26, 32, and 33 are objected to because of the following informalities: claims 14 and 19—and all their dependent claims—recite the language of “vaporizing the solid material.” The specification makes no mention of the term vaporize but this is not a new matter issue because the disclosure of volatilization means can be construed as vaporization means. Consistency of terms, however, is recommended.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 14, 15, 17, 18, and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Gaisford (US 5,103,181).

8. Regarding claim 14, Gaisford discloses a material detection system, comprising: a plasma processing chamber (see funnel of figure 11); a flow path in fluid communication with the processing chamber, wherein the medium of interest contains a solid material **36** to be detected; an electromagnetic energy source **35** downstream from the plasma processing chamber (see tube in figure 11) coupled to the flow path for exciting said medium of interest (column 14, lines 14-24) capable of vaporizing the solid material contained therein; and an impedance measuring device for measuring an

impedance value of an electromagnetic circuit, said electromagnetic circuit including said flow path therein, wherein said impedance value corresponds to an amount of solid material within said medium of interest (column 1, lines 6-21). The flow path of Gaisford is capable of transporting a medium of interest to and from the processing chamber.

9. Regarding claim 15, Gaisford discloses that said electromagnetic circuit further comprises at least one of a microwave circuit and a radio frequency (RF) circuit (column 7, lines 33-41).

10. Regarding claim 17, Gaisford discloses that said impedance measuring device is configured to determine an impedance magnitude value and an impedance phase value (column 10, line 58 to column 11, line 3).

11. Regarding claim 18, Gaisford discloses a mechanism for determining variations of said impedance magnitude and phase values over time (column 27, lines 36-49).

12. Regarding claim 32, Gaisford disclose that the electromagnetic energy source is configured to provide a first power and a second power duty cycle (column 25, lines 55 to column 26, line 5). The high power duty cycle is capable of vaporizing the solid material were enough power supplied to it and the impedance measuring device is capable of operating during the low power duty cycle.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

16. Claims 19, 20, 22, 23 and 33 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Gaisford.

17. Regarding claim 19, Gaisford discloses an electromagnetic energy source 35 coupled to an effluent carrying conduit (see tube in figure 11) downstream from a plasma processing chamber (see funnel in figure 11), wherein the electromagnetic energy source is configured to cause excitation of a gas having reactive species therein (column 14, lines 14-24), wherein the excited gas may include a solid material (column

1, lines 17-21), and wherein the excitation is capable of vaporizing the solid material; and an impedance measuring device for measuring an impedance value of an electromagnetic circuit, said electromagnetic circuit including said excited gas therein, wherein said impedance value corresponds to an amount of solid material within said gas (column 1, lines 6-21). Gaisford, however, does not explicitly disclose a mechanism for uniformly conveying the excited gas. This feature is either inherent since Gaisford discloses the use of a pump (column 15, lines 17-20) or it would have been obvious to one having ordinary skill in the art at the time of invention to provide a mechanism for uniform flow as Gaisford discloses the importance of such a feature (column 22, lines 54-58).

18. Regarding claim 20, Gaisford discloses that said electromagnetic circuit further comprises at least one of a microwave circuit and a radio frequency (RF) circuit (column 7, lines 33-41).

19. Regarding claim 22, Gaisford discloses that said impedance measuring device is configured to determine an impedance magnitude value and an impedance phase value (column 10, line 58 to column 11, line 3).

20. Regarding claim 23, Gaisford discloses a mechanism for determining variations of said impedance magnitude and phase values over time (column 27, lines 36-49).

21. Regarding claim 33, Gaisford disclose that the electromagnetic energy source is configured to provide a first power and a second power duty cycle (column 25, lines 55 to column 26, line 5). The high power duty cycle is capable of vaporizing the solid

material were enough power supplied to it and the impedance measuring device is capable of operating during the low power duty cycle.

22. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gaisford as applied to claim 19 above, and further in view of Beaudry (US 3,569,777) and Mills (US 2004/0118348 A1).

23. Regarding claim 21, while Gaisford discloses the excitation of gas using radio frequency energy (column 7, lines 33-41), Gaisford does not disclose that said downstream electromagnetic energy source is configured to excite said medium of interest into plasma. The invention of Gaisford, however, is for use in a wide variety of industrial applications (detailed in column 3). The invention of Beaudry, meanwhile, discloses the necessity for accurate impedance values in plasmas containing solids (column 1, lines 53-60). It would have been obvious to one having ordinary skill in the art at the time of invention to use the invention of Gaisford in the plasma forming process of Beaudry as knowing the solid composition is of importance in Beaudry and Gaisford is one known means to do so.

24. Neither Gaisford nor Beaudry disclose the use of microwave energy for the creation of plasma. Microwave energy—as is commonly known in the art—is simply a higher energy form of energy than radio frequency energy. Mills—in an invention relating to impedance matching of plasma—discloses the interchangeability of these two forms of energy (paragraph 374). While Mills discloses use of RF in lieu of microwave power, it would have been obvious to one having ordinary skill in the art at the time of invention to use the microwave power of Mills in the invention of Beaudry

and Gaisford if more energy was needed than what radio frequency provides to excite the gas into a plasma--thereby turning the plasma into a microwave plasma.

25. Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gaisford as applied to claim 22 above and further in view of Beaudry (US 3,569,777).

26. Regarding claims 24 and 25, while Gaisford discloses the excitation of gas using radio frequency energy (column 7, lines 33-41), Gaisford does not disclose what power said downstream electromagnetic energy source is configured to apply. The invention of Gaisford, however, is for use in a wide variety of industrial applications (detailed in column 3). The invention of Beaudry, meanwhile, discloses the necessity for accurate impedance values in plasmas containing solids (column 1, lines 53-60) at a power at a power level of about 300 watts (column 5, lines 4-6). It would have been obvious to one having ordinary skill in the art at the time of invention to use the invention of Gaisford in the plasma forming process of Beaudry as knowing the solid composition is of importance in Beaudry and this would be an appropriate power to do so.

27. Regarding claim 26, while Gaisford discloses an impedance measuring device for measuring an impedance value of an electromagnetic circuit, said electromagnetic circuit including said excited gas therein, wherein said impedance value corresponds to an amount of solid material within said gas (column 1, lines 6-21), Gaisford does not disclose that said impedance measuring device is configured for facilitating endpoint detection of removal of said photoresist material. The invention of Gaisford, however, is for use in a wide variety of industrial applications (detailed in column 3). The invention of Beaudry, meanwhile, discloses the necessity for accurate impedance values in plasmas

containing solids (column 1, lines 53-60) for photoresist removal (column 1, lines 8-33). It would have been obvious to one having ordinary skill in the art at the time of invention to use the invention of Gaisford in the plasma forming process of Beaudry as knowing the solid composition is of importance in Beaudry and Gaisford is one known means to do so.

Conclusion

28. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **IMRAN AKRAM** whose telephone number is (571)270-3241. The examiner can normally be reached on 10-7 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

IA

/Alexa D. Neckel/
Supervisory Patent Examiner, Art Unit 1795